EFFECT OF “UDU”, AN ANTIMALARIAL HERBAL PREPARATION ON VISCERAL ORGAN WEIGHT AND BLOOD LIPID PROFILES IN WISTAR RATS

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ABSTRACT
Effect of “udu”, an antimalarial herbal preparation popular in Umunchi community Isiala Mbano L.G.A of Imo State, Nigeria on visceral organ weight and blood lipid profiles was carried out using standard methods. Forty male wistar albino rats separated into five groups of eight rats each were used. One group served as the control while the other groups were given different doses of the herbal preparation. Results obtained revealed that “udu” had insignificant (p>0.05) effect on visceral organ weight and relative organ weight in test rats when compared to those of the control rats. Some blood lipid profile indices were affected significantly (p<0.05) in test rats against the control. This study has revealed the effect of “udu”, an antimalarial herbal preparation on visceral organ weight and blood lipid profiles in wistar rats.

Keywords: Herbal preparation, lipid profile indices, medicinal plants, “udu”, visceral organs.

1. INTRODUCTION
The declaration of Alma-Ata on September, 1978 saw the acceptance of age long form of treatment known as traditional medicine [1]. Since then, the practice of traditional medicine was globally embraced. Traditional medicine makes use of medicinal plants and their products as raw materials [2]. These plants come in different species and varieties [3]. Different authors have demonstrated the efficacy of these plants or their products against diseases [4-6]. Extract from parts of these medicinal plants such as root, bark, seed, fruits, etc, are used for herbal preparations such as infusions, syrups, decoctions, and concoctions which are effective against diseases such as malaria, typhoid fever, headache, stomach aches, piles, constipation, infertility, yellow fever, etc [7-8].

“udu”, an antimalarial herbal preparation popular in Umunchi community Isiala Mban L.G.A of Imo State, Nigeria is among such herbal preparations made from parts of medicinal plants that are effective against diseases. The leaves of Gongronema latifolium, Carica papaya, Musa paradisiaca, Citrus sinensis, Buchholzia coriacea known among the Igbo tribe of South-eastern, Nigeria as “utazi”, “okpurukwa” “unere”, “oroma”, “uke” respectively and Psidium guajava commonly called guava [2, 3, 9-12] were used for the preparation.
The efficacy of “udu” against malaria disease has attracted different names to it within the community. These names are used by the people of the community to showcase the efficacy of the herbal preparation at a glance.

Existing studies on “udu” investigated its bioactive constituents and macronutrients composition [13]; chemical profile [14]; and toxicity studies [15]. There is need to extend the study on “udu” to other biochemical parameters. The present study therefore assessed the effect of "udu", on visceral organ weight and blood lipid profiles in wistar rats.

2. MATERIALS AND METHODS
2.1. Location: Isiala Mbano L.G.A. is located between latitude 7.00’ and 7”25’ North and Longitude 5.35’ and 51.45’ East in Imo State, Nigeria. Umunchi community is situated within these latitudes and longitudes.

2.2. Plant Material Collection: The G. latifolium, C. papaya, P. guajava, M. paradisiaca, C. sinensis, and B. coriacea leaves were collected from a farm in Umunchi in Isiala Mban L. G.A. of Imo State, Nigeria and were properly identified by Dr. F. N. Mbagwu, in the Department of Plant Science and Biotechnology, Imo State University Owerri, Nigeria.

2.3. “udu” Preparation: The collected and identified leaf samples were properly washed to remove dirt, after which twenty grams of each of the identified leaves were weighed and placed in a medium sized sterilized pot and two dm³
of water was added. The content was boiled for one hour. The coloured solution obtained after boiling (“udu”) was carefully decanted into a sterilized bottle after it was allowed to cool. The prepared “udu” was stored in a refrigerator to prevent spoilage.

2.4. Experimental Animals and Design: A total of forty (40) male wistar albino rats weighing between 100- 120g were purchased from the animal colony of Department of Biochemistry, Abia State University, Uturu, Abia State, Nigeria and kept in standard cages for 4 days to enable them acclimatize to their new environment. Pelletized commercial rat feed (Pfizer livestock Co. Ltd, Aba, Nigeria) and portable water was given to the rats ad libitum within this period. After acclimatization period, the rats were allocated to 5 groups of 8 rats each and their weights were equalized as nearly as possible. Aside the control group, prepared “udu” was given orally to other rats on a daily basis for sixty days after allocation. Treatments for rats were as follows;

Control group = Normal feed + portable water; Group I2 = 2ml of “udu” + normal feed + portable water; Group I4 =4ml of “udu”+ normal feed + portable water; Group I6= 6ml of “udu” + normal feed + portable water and Group I8 = 8ml of “udu” + normal feed + portable water.

Rats on high doses were given the prepared “udu” intermittently. All animals were treated according to JHU [16] animal care and use policies and guidelines.

2.5 Analysis of Chemical Constituents in “udu”: Phytochemicals present in “udu” herbal preparation were determined using the methods of AOAC [17]. Vitamins present in “udu” were determined using the methods of Amadi et al., [18]. Minerals analysed in “udu” were done using the methods described by Shahidi et al. [19].

2.6. Blood Sample Collection: At the end of sixty days treatment period, the rats were reweighed; Anaesthetic ether was used to anaesthetize the rats before they were sacrificed by making incisions at their cervical regions with sterile blade. Their organs were excised and their weights taken. Blood was collected by cardiac puncture into anticoagulant tubes with corks for lipid profile test. The tubes were used for analysis.

2.7. Lipid Profile Parameters: Aside very low density lipoproteins, VLDL, the assays were performed according to their manufacturers’ instructions using diagnostic test kits for the lipid profile parameters purchased from BioSystems® (S.A. Costa Brava of Barcelona, Spain). VLDL concentration was estimated using the methods of Burnstein and Sammaille [20]. LDL-cholesterol/ HDL-cholesterol ratio and Total cholesterol (TC)/ HDL-cholesterol ratio were determined using simple mathematical method

2.8. Statistical Analysis: Results obtained were expressed as mean. Data were analysed using students’ t-test at 5% significant level.

3. RESULTS AND CONCLUSION
Table 1 shows the chemical constituents found in “udu”. The importance of phytochemicals in the body system has been reported by different authors [12, 21]. As bioactive compounds, they exhibit marked physiological effects on diseases [22]. Aside cyanogenic glycosides, phytochemicals such as alkaloids, flavonoids, saponins, tanins, and phytates have been reported by different authors [5-7, 12, 21-27] to benefit the body system. Vitamins used therapeutically can be of immense help in fighting disease and speedy recovery [28]. The absence of vitamins over a sustained period of time in the body impairs metabolism, which results in clinic abnormalities as characteristics used to identify them [28-29]. Olusanya [30], Onwuka [31], Akwaowo et al., [26] stressed the need to have minerals in the body system. The deficiencies of minerals could result in burden of diseases in the body. Amino acids are the building blocks of proteins. The importance of proteins in the body cannot be over stated. Amino acids contribute to the synthesis of other important compounds needed in the body and in body defence against diseases [31].
Table 1: Chemicals constituents in “udu”

<table>
<thead>
<tr>
<th>Chemical constituents</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phytochemicals</strong></td>
<td></td>
</tr>
<tr>
<td>Alkaloids</td>
<td>+</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>+</td>
</tr>
<tr>
<td>Saponins</td>
<td>+</td>
</tr>
<tr>
<td>Tannins</td>
<td>+</td>
</tr>
<tr>
<td>Cyanogenic glycosides</td>
<td>+</td>
</tr>
<tr>
<td>Phytates</td>
<td>+</td>
</tr>
<tr>
<td><strong>Vitamins</strong></td>
<td></td>
</tr>
<tr>
<td>Retinol</td>
<td>+</td>
</tr>
<tr>
<td>Thiamine</td>
<td>+</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>+</td>
</tr>
<tr>
<td>Niacin</td>
<td>+</td>
</tr>
<tr>
<td>Tocopherol</td>
<td>+</td>
</tr>
<tr>
<td><strong>Minerals</strong></td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>+</td>
</tr>
<tr>
<td>Calcium</td>
<td>+</td>
</tr>
<tr>
<td>Potassium</td>
<td>+</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>+</td>
</tr>
<tr>
<td>Zinc</td>
<td>+</td>
</tr>
<tr>
<td>Iron</td>
<td>+</td>
</tr>
<tr>
<td>Manganese</td>
<td>+</td>
</tr>
<tr>
<td><strong>Amino acids</strong></td>
<td></td>
</tr>
<tr>
<td>Some essential amino acids</td>
<td>+</td>
</tr>
<tr>
<td>Some non-essential amino acids</td>
<td>+</td>
</tr>
<tr>
<td>Total concentration (mg/ml)</td>
<td>5.09</td>
</tr>
</tbody>
</table>

Key: + = present

Fig. 1: Visceral organ weight of rats given “udu” for sixty days.

The use of herbal preparations such as infusions, concoctions, decoctions, etc, has long been in practice for years and their efficacy have also been confirmed [32-34]. In recent times, there are accumulating reports of organ injuries, organ expansions [35-36], and other effects after the intake of these herbal preparations. Organ injuries if
not detected and treated on time can lead to death of an organism. No death was observed among the test rats in this study. Expansion of organs adds to the body weight. Expansion and injury of the organ could be as a result of disease condition. Non-alcoholic steatohepatitis (NASH), splenomegaly, cystic fibrosis, and pancreatitis are among the diseases that can bring about the expansion of the liver, spleen, lungs, and pancreas respectively [37-39]. The Fig.1 revealed insignificant (p>0.05) effect of “udu” on visceral organ weight of test rats when compared to the control. The same insignificant (p>0.05) effect was observed in relative organ weight (Fig. 2) of test rats against the control in the present study. This observation could be an indication that “udu” does not bring about the expansion of visceral organs when consumed normally.

![Relative organ weight of rats given “udu” for sixty days (%)](image1)

Fig. 2: Relative organ weight of rats given “udu” for sixty days (%).

![Lipid profiles of rats given “udu” for sixty days](image2)

Fig. 3: Lipid profiles of rats given “udu” for sixty days.
Lipid profile indices are used to determine or predict the status of the body in relation to heart diseases such as atherosclerosis, heart attack, stroke, etc. [40-43]. Cholesterol is produced in the liver and is insoluble in blood [27]. To become soluble in the body, cholesterol binds to apoprotein to form lipoprotein. Lipoprotein is of two major types namely; low-density lipoprotein (LDL) or high-density lipoprotein (HDL) [43]. Base on their functions, Low-density lipoproteins (LDL) are the major cholesterol carriers in the blood. Very low-density lipoproteins (VLDL) also give rise to low-density lipoproteins (LDL) after performing their utmost function in the body [44]. High levels of LDL-cholesterol are associated to plague formation in the arteries. This can result in heart diseases or stroke [43]. High-density lipoprotein (HDL-cholesterol) cholesterol does more of cleaning up of the arteries hence it prevent blockage of arteries. HDL-cholesterol is the good cholesterol of the body (LRCP, 1984a). Lipid profiles of rats given “udu” as presented in Fig.3 depict significant reduction (p<0.05) in total cholesterol, VLDL-cholesterol, and LDH-cholesterol levels in test groups against the control. Triglyceride reduced significantly (p<0.05) in test groups I4, I6 and I8 against those of the control rats. HDL-cholesterol as observed in the present study significantly (p<0.05) increased in test groups I4, I6, and I8 against the control. Glew [45] noted that the risk of developing atherosclerosis is directly related to plasma LDL-cholesterol and inversely related to HDL-cholesterol levels. It therefore implies that consumption of “udu” could hinder the development of such disease since it encouraged the production of HDL-cholesterol; the good cholesterol, and lowered the production of LDL-cholesterol; the bad cholesterol in the body of test rats given high doses in the present study. Total cholesterol to HDL-cholesterol and LDL-cholesterol to HDL-cholesterol ratios determined in this study were lower when compared to those of the control. The observed low total cholesterol to HDL-cholesterol and LDL-cholesterol to HDL-cholesterol ratios could be indication that “udu” can act against diseases inherent from rise in lipid profile indices in the body. Ibegbulem, et al., [32] had similar effects on rats placed on Terminalia catappa Linn decoction. The observation of the present study is in line with the reports of Siddiqui et al., [46] and Colquhoun et al., [47] who have demonstrated the cholesterol reducing effects of some trado-medicinal preparations.

4. CONCLUSION
Conclusively, this study has revealed the effect of “udu” an antimalarial herbal preparation on visceral organ weight and blood lipid profiles using rats. Those that consume “udu” may be exposed to these effects.

5. REFERENCES


